

CLAIMS

What is claimed is:

1. A method for processing data on a distributed computing system that includes a plurality of nodes, the method comprising the steps of:
- in response to receiving a first work request to perform first work from a first process on a first node from the plurality of nodes, determining based upon the first work that the first work is to be performed on a second node from the plurality of nodes; and
- providing the first work request to a second process on the second node, wherein the first work request specifies that the first process is to receive results of the first work directly from the second process.
2. The method as recited in Claim 1, further including the steps of
- in response to receiving a second request to perform second work from the first process, determining that the second work is to be performed on a third node from the plurality of nodes, and
- providing the second request to a third process on the third node, wherein the second request specifies that the first process is to receive results of the second work directly from the third process.
3. The method as recited in Claim 1, further including the steps of
- in response to receiving a second request to perform second work from a third process on a third node from the plurality of nodes, determining that the second work is to be performed on the second node, and

5 providing the second request to the second process, wherein the second request
6 specifies that the third process is to receive results of the second work
7 directly from the second process.

1 4. The method as recited in Claim 1, further including the steps of
2 in response to receiving a second request to perform second work from a third
3 process on a third node from the plurality of nodes, determining a fourth
4 node from the plurality of nodes on which the second work is to be
5 performed, and
6 providing the second request to a fourth process on the fourth node, wherein the
7 second request specifies that the third process is to receive results of the
8 second work directly from the fourth process.

1 5. The method as recited in Claim 1, further including the steps of
2 determining that the first work is also to be performed on a third node from the
3 plurality of nodes, and
4 providing a second request to a third process on the third node, wherein the
5 second request specifies that results of the first work performed on the
6 third node are to be provided from the third node directly to the first
7 process.

1 6. The method as recited in Claim 1, wherein the step of determining that the first
2 work is to be performed on a second node includes the step of
3 determining one or more resources required to perform the first work, and
4 determining which of the plurality of nodes is allowed to perform the first work
5 on the one or more resources.

- 1 7. The method as recited in Claim 1, wherein:
2 the step of determining that the first work is to be performed on a second node
3 from the plurality of nodes includes the step of a director determining that
4 the first work is to be performed on a second node from the plurality of
5 nodes, and
6 the step of providing the first work request to a second process on the second
7 node includes the step of the director providing the first work request to a
8 second process on the second node.
- 1 8. The method as recited in Claim 1, further comprising the step of upon completion
2 of the first work, the second process providing the results of the first work directly
3 to the first process.
- 1 9. The method as recited in Claim 1, wherein the first work request is a remote
2 procedure call.
- 1 10. The method as recited in Claim 1, further including the step of generating an
2 updated first work request that specifies that the first process is to receive the first
3 results of performing the first work and wherein the step of providing the first
4 work request to a second process includes the step of providing the updated first
5 work request to the second process.
- 1 11. A method for processing data on a distributed computing system that includes a
2 plurality of nodes, the method comprising the steps of:
3 a director receiving a first remote procedure call from a first client process on a
4 first client node from the plurality of nodes, wherein the first remote
5 procedure call requests that first work be performed and that results of the
6 first work be provided directly to the first client process;

7 the director examining the first remote procedure call and determining that a first
8 server process on a first server node from the plurality of nodes is to
9 perform the first work; and
10 the director providing the first remote procedure call to the first server process.

1 12. The method as recited in Claim 11, further including the steps of
2 the director determining one or more resources required to perform the first work,
3 and
4 the director determining which of the plurality of nodes have permission to
5 perform a requested operation on the one or more resources required to
6 perform the first work.

1 13. The method as recited in Claim 12, wherein the step of the director determining
2 the resources available on the plurality of nodes includes the director examining
3 resource data associated with the plurality of nodes.

1 14. The method as recited in Claim 11, further including the steps of
2 the director receiving a second remote procedure call from the first client process,
3 wherein the second remote procedure call requests that second work be
4 performed and that results of the second work be provided directly to the
5 first client process,
6 the director examining the second remote procedure call and determining that a
7 second server process on a second server node from the plurality of nodes
8 is to perform the second work, and
9 the director providing the second remote procedure call to the second server
10 process.

1 15. The method as recited in Claim 11, further including the steps of
2 the director receiving a second remote procedure call from a second client process
3 on a second client node in the plurality of nodes, wherein the second
4 remote procedure call requests that second work be performed and that
5 results of the second work be provided directly to the second client
6 process,
7 the director examining the second remote procedure call and determining that a
8 second server process on a second server node from the plurality of nodes
9 is to perform the second work, and
10 the director providing the second remote procedure call to the second server
11 process.

1 16. A distributed computing system for performing work, the distributed computing
2 system comprising:
3 a plurality of nodes; and
4 a director communicatively coupled to the plurality of nodes, the director being
5 configured to
6 in response to a first work request to perform first work from a first
7 process on a first node from the plurality of nodes, determine that
8 the first work is to be performed on a second node from the
9 plurality of nodes, and
10 request that the first work be performed by a second process on the second
11 node, wherein the request specifies that first results of the first
12 work be provided from the second process directly to the first
13 process.

1 17. The distributed computing system as recited in Claim 16, wherein the director is
2 further configured to provide the first work request to the second process.

1 18. The distributed computing system as recited in Claim 16, wherein the director is
2 further configured to
3 generate a second work request to requests that the second process perform the
4 first work and provide the first results directly to the first process, and
5 provide the second work request to the second process.

1 19. The distributed computing system as recited in Claim 16, further comprising
2 resource data that specifies the access rights of the plurality of nodes relative to
3 resources.

1 20. A computer-readable medium carrying one or more sequences of one or more
2 instructions for processing data on a distributed computing system that includes a
3 plurality of nodes, the one or more sequences of one or more instructions include
4 instructions which, when executed by one or more processors, cause the one or
5 more processors to perform the steps of:
6 in response to receiving a first work request to perform first work from a first
7 process on a first node from the plurality of nodes, determining based
8 upon the first work that the first work is to be performed on a second node
9 from the plurality of nodes; and
10 providing the first work request to a second process on the second node, wherein
11 the first work request specifies that the first process is to receive results of
12 the first work directly from the second process.

1 21. The computer-readable medium as recited in Claim 20, further including the steps
2 of
3 in response to receiving a second request to perform second work from the first
4 process, determining that the second work is to be performed on a third
5 node from the plurality of nodes, and

6 providing the second request to a third process on the third node, wherein the
7 second request specifies that the first process is to receive results of the
8 second work directly from the third process.

1 22. The computer-readable medium as recited in Claim 20, further including the steps
2 of
3 in response to receiving a second request to perform second work from a third
4 process on a third node from the plurality of nodes, determining that the
5 second work is to be performed on the second node, and
6 providing the second request to the second process, wherein the second request
7 specifies that the third process is to receive results of the second work
8 directly from the second process.

1 23. The computer-readable medium as recited in Claim 20, further including the steps
2 of
3 in response to receiving a second request to perform second work from a third
4 process on a third node from the plurality of nodes, determining a fourth
5 node from the plurality of nodes on which the second work is to be
6 performed, and
7 providing the second request to a fourth process on the fourth node, wherein the
8 second request specifies that the third process is to receive results of the
9 second work directly from the fourth process.

1 24. The computer-readable medium as recited in Claim 20, further including the steps
2 of
3 determining that the first work is also to be performed on a third node from the
4 plurality of nodes, and

5 providing a second request to a third process on the third node, wherein the
6 second request specifies that results of the first work performed on the
7 third node are to be provided from the third node directly to the first
8 process.

1 25. The computer-readable medium as recited in Claim 20, wherein the step of
2 determining that the first work is to be performed on a second node includes the
3 step of
4 determining one or more resources required to perform the first work, and
5 determining which of the plurality of nodes is allowed to perform the first work
6 on the one or more resources.

1 26. The computer-readable medium as recited in Claim 20, wherein:
2 the step of determining that the first work is to be performed on a second node
3 from the plurality of nodes includes the step of a director determining that
4 the first work is to be performed on a second node from the plurality of
5 nodes, and
6 the step of providing the first work request to a second process on the second
7 node includes the step of the director providing the first work request to a
8 second process on the second node.

1 27. The computer-readable medium as recited in Claim 20, further comprising the
2 step of upon completion of the first work, the second process providing the results
3 of the first work directly to the first process.

1 28. The computer-readable medium as recited in Claim 20, wherein the first work
2 request is a remote procedure call.

- 1 29. The computer-readable medium as recited in Claim 20, further including the step
2 of generating an updated first work request that specifies that the first process is to
3 receive the first results of performing the first work and wherein the step of
4 providing the first work request to a second process includes the step of providing
5 the updated first work request to the second process.

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